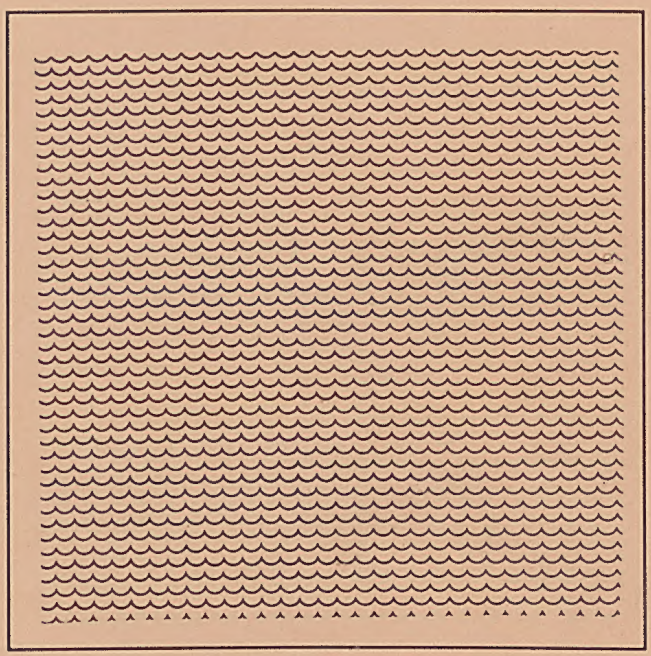
AUSTRALIAN SOCIETY FOR LIMNOLOGY INC

NEWSLETTER



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MEMBERSHIP DETAILS

The Australian Society for Limnology Inc. (ASL) is an association of over 400 people with professional or amateur interests related to Australian inland waters. Since its inception in 1961, the society has played an important role in fostering limnology in this country. The ASL promotes liaison between limnologists in academic, government and private institutions and has a vested interest in the conservation of aquatic and related resources. Annual conferences are held near centres of limnological interest, and the programme includes scientific sessions, field excursions and social activities.

The ASL regularly produces a newsletter with notes on limnological activities, articles of general interest, book reviews and announcements of upcoming events likely to be of interest to members. Occasionally, it produces a Special Publication series and a Directory of Members.

Membership applications are welcome from any person with an interest in limnology. Five classes of subscribing membership are available:

Ordinary members	$ 20.00
Student members	$ 10.00
Life members	$200.00
Institutional members	Fees on application
Sustaining members	Fees on application

Membership covers the period from 1 July to 30 June and all members receive the regular and occasional publications produced by the society. Members may also choose to receive the Australian Journal of Marine and Freshwater Science, the Australian Journal of Zoology and/or the Australian Journal of Botany at special reduced rates. The subscription for each journal is based on the calendar year in which the subscription is paid.

Enquiries relating to membership should be directed to the Membership Officer:

Mrs Margaret Hart
22 Netherby Avenue
MULGRAVE VIC 3170 Ph. (03) 5604406 [Fax (03) 2113646]

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Material for publication in the December issue of the newsletter should be sent to the editors before the 23rd of November (1990, that is!).

Contributions are welcome on any topic concerned with limnology (or anything else that may be of interest to the readers). Long articles should be forwarded as unformatted text on IBM or IBM-compatible discs, or as formatted text in any commonly used word processing package (e.g. WordPerfect, Microsoft Word, Wordstar). All those with Macs, send your crayon hard copy (I bet you have dot matrix printers too). Camera ready copy can also be sent.

Cover: The cover shows Letratone LT140, featuring what appears to be some sort of water motif (if we keep up these trash covers for much longer - and ARI has plenty of Letratone to spare - surely some-one with artistic ability will come to our aid).

Editorial

HELLO, IS THERE ANYONE OUT THERE?

Hello, is there anyone out there? [*FX*: nothing but a hollow echo] Obviously, not. That is, judging by the overwhelming silence that greeted the last issue of the newsletter. The mail exchanges throughout Australia were running cold with submissions. The poor dude who delivers the mail to ARI floated under the weight of letters coming in to the editors.

So what did we get! As this is a family newsletter, we cannot use the vernacular acronym to describe the volume of mail ... you know the one ... three letters ... something about the Scottish Football Association ... yeah, that one. Not a sausage. Nil. Nix. Nothing. We can only assume there are no great issues facing the society that require comment from the members. Like the Bulletin (Allah rest it's soul), maybe there is just a lack of interest. Lethargy rules, O.K.

What's that? ... You didn't get your copy of the last issue until after the deadline! Well, in the time-honoured tradition of editors all over the world, we can easily deflect the blame for that one. It appears that a number of members (95 to be exact) mysteriously disappeared off the new user-friendly computer that now handles all the membership details and other stuff. When we got the labels for the mail-out, these "unfortunatos" did not receive their copy in the first run. Luckily, the error was noticed and immediately corrected. The poor souls received their copy, even though it was probably too close to the deadline for copy for this issue and so they can't reasonably have been expected to have sent us anything. We'll let those people off with a simple warning this time.

That still leaves the 285 members who did get an issue with time to spare. In the words of the great bearded one (Channel 7, 7:00 pm, weekdays) - Shame, shame, shame.

O.K. It's not really that bad. There are some things in this issue of interest that have been supplied by the members. A lot of this issue is devoted to transcripts and state-by-state summaries from the wetlands session at the ASL conference at Jabiru, put together by Jane Roberts of CSIRO in Griffith ('onya Jane - take a gold elephant stamp!) Along with a short note from Peter Gehrke on fish nursery habitats. We also have the regular Prattlebutt (editorial abbreviation there) from Western Australia and New South Wales, the odd announcement and the Bibliography.

In other bits, there is a column from our beloved secretary, who has agreed (under no provocation, but he may have misunderstood our reference to the shooting-off-of-kneecaps) to scrawl a few words on the mail that passes over his desk. The section in this issue on FASTS is of **VITAL** concern to members and should be read and digested by

everyone. It involves your money! Also, in order to inform and warn members of issues likely to come up, we have and will publish the minutes from the regular executive meetings (making sure they don't spend those phone conferences swapping recipes or the like). Included here are two sets of minutes from the meetings, with the old and the new executives, at Jabiru. The AGM minutes will be published in the last Newsletter before the next conference. Also, the "Column Inch" section of the FASTS Newsletter. A few of those "borrowed" cartoons should keep you going through all this heavy stuff. And Blasts from the Past, a biased selection of quotes from Newsletters of 5 and 10 years ago (amazing what you find cleaning out your filing cabinets).

Of interest are short articles from Florian Illies, son of Prof. Joachim Illies and budding journalist, on the Limnologische Flusstation on the Breitenbach - obviously the Acheron River of European limnology. Anyone else out there in the wide world who would like to send some sort of background information on overseas research stations is welcome (Bermuda? Jamaica? Or an invitation to the editors to visit and write the report themselves would be, we think, a nice idea indeed).

You should all be receiving this issue at the one time, and in plenty of time. Hence, there is simply no excuse for missing the next deadline (repeat after us, the deadline for the December issue is November 23 - 1990!).

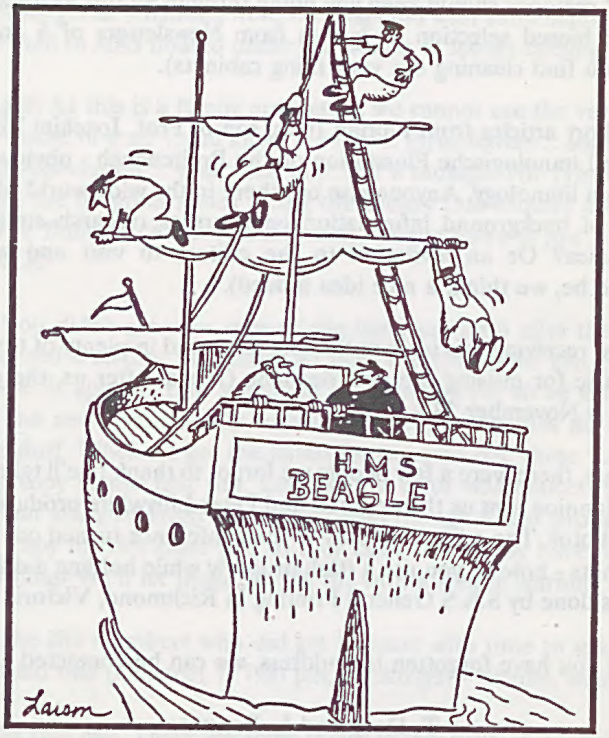
After the last issue, there were a few people we forgot to thank (we'll take the rap for that one). Michael Mannion sent us the originals and Peter Lillywhite produced the half-tones of the Kakadu photos. The editors' photos of the conference turned out to be a series of half-frame leg-shots - how do you use a flash properly while holding a drink in one hand? The printing was done by S.A.S General Printing in Richmond, Victoria (nice job, guys).

And just in case you have forgotten the address, we can be contacted at:

T. Doeg and L. Barmuta
Editors, ASL Newsletter
Arthur Rylah Institute for Environmental Research
123 Brown Street
Heidelberg
VIC 3084

Ph: (03) 450 8622
FAX: (03) 450 8799

or send it through your executive or regional representative (addresses at the end of this issue).



"Well, Mr. Darwin. ...Have you reached any conclusions, so far?"

PRATTLE, SCUTTLEBUTT AND RUMOUR

WESTERN AUSTRALIA

Correspondent: Adrian Pinder, School of Biological and Environmental Sciences, Murdoch University, Murdoch, Western Australia 6150.

While not strictly limnological, the birth of a baby girl to Jane Chambers (with some help from Eric Paling), shook the earth on August 3rd. All, including Eric, are well (is that prattle, rumour or scuttlebutt?). Otherwise, things are going smoothly in the Centre for Water Research at Murdoch. Arthur McComb recently attended a workshop in South Australia on the "Potential of Wetlands for Improvement of Water Quality", where he presented a paper with Ray Froend and Jane on the importance of wetlands in modifying nutrient loading into catchment streams. Arthur will also give a paper with Bob Humphries (WA EPA), on nutrient related problems within the Peel-Harvey Estuary system, at the INTERCOL conference in Japan in August. Goen Ho, lecturer in environmental engineering at Murdoch, has recently returned from Japan, where he attended the International Association for Water Pollution Research and Control Conference. Frank Wang, expatriate Chinese, is here doing some work on lake sediment-oxygen dynamics and has been visiting many Perth lakes with Ludwig Schmidt from the Water Authority.

Various projects in the wetland and stream ecology group are also progressing well. Ivor (Growns) is looking forward to the not too distant future when his sampling of Karri forest streams will be complete. Occasionally, Jane Growns and Faye Christidis emerge from their pile of wetland invertebrate samples to carry out some Computer-Assisted Data Massaging (CADM? - *Eds.*). Mark Lund is preparing to put theory into practice by manipulating zooplankton populations to improve the water quality of Lake Monger, he couldn't possibly make it worse. I hope it works, or he'll have to pay back his ASL student prize (now that's scuttlebutt). All is quiet on the midge research front, it be too cold for the blighters (and for the field workers). Belinda Robson has received first class honours for her work on the effects of salinisation on the macroinvertebrate fauna of wandoo forest streams (congratulations!!).

Meanwhile, Kerry Trayler, Debbie Kirby, Keely George and Celeste Wilson have all started honours projects at Murdoch. They are respectively: the effects of insect growth regulator pyriproxfen on non-target organisms, the influence of nutrient enrichment on chironomid population ecology, comparisons of the macroinvertebrate communities of different stands of emergent macrophytes, and the effects of organic matter on phytoplankton growth.

At the Department of Conservation and Land Management, Stuart Halse and Andrew Storey are continuing their surveys on the use of wetlands by waterbirds. They have also recently carried out some macroinvertebrate surveys in rivers and streams in the Two Peoples Bay area near Albany.

At the University of Western Australia, Peter Davies has finished all his field work and is rumoured (scuttlebutted? - *Eds.*) to be thinking seriously about the possibility of maybe finishing his PhD. David Cale is continuing with his work on the macroinvertebrate communities of artificial wetlands (created as a by-product of mineral sands mining), which are being rehabilitated with the aim of waterbird conservation. He is conducting nutrient addition experiments and experimenting with different macrophyte habitats to determine what is limiting the development of diverse and productive invertebrate communities. The Murdoch branch of the Centre for Water Research are also involved in the rehabilitation of these wetlands, including the establishment of fringing vegetation. In his continuing efforts to determine the reason why trichopteran larvae live in the places that they do, Louis Lebel has just completed a suite of manipulative experiments. Meanwhile, Belinda Murray is in the midst of sorting and data collection in a survey aimed at determining the longitudinal distribution of the invertebrate fauna, as a temporary stream flows into a perennial stream.

NEW SOUTH WALES

Correspondent: John Hawking, MDFRC P.O. Box 913 Albury NSW (Fax: 060-431626)

Murray-Darling Freshwater Research Centre

Activities at the centre have remained hectic, with laboratory "open days", staff changes, staff attending conference and the dreaded review. The laboratory was open to the district's schools on Thursday 9th and Friday 10th , and for the general public on Saturday 11th August. The "open days" were a huge success with some excellent displays and an unbelievable number of people in attendance.

Naomi Bray (our chironomid expert) moved to Conservation and Environment and is now paddling in wetlands around Horsham. Her position has been filled by Daryl Nielsen, who comes from the Victorian Fisheries Station at Snobs Creek. Rhonda Butcher moved to Rural Water Commission and is now looking at macroinvertebrates throughout Victoria. Garth Watson has filled Rhonda's position and will continue counting Russ Shield's zooplankton. Garth was formally with CSIRO's Division of Bio-molecular Engineering

and the Victorian Department of Agriculture. Robert Cook (Monash Univ.) is providing the technical support for Peter Cranston and Terry Hillman's AWRAC grant "Use of chironomid pupal exuviae as biological indicators".

Rod Oliver attended the Workshop on Toxic Cyanobacteria, held at the Engineering and Water Supply Department's Water laboratory in Adelaide. Judy Frankenberg attended the conference, "Boating on inland waterways" held at Wodonga, and presented a paper "Protection of river banks from erosion". David Mitchell and Brian Sorrell attended the conference on Biological Nutrient Removal at Bendigo. David read the keynote address, which was titled "The flush of success: innovations in management of wastewaters".

Our visiting scientist, Harry Casey has been busy visiting Bill Williams and Keith Walker in Adelaide and presenting a seminar at Monash University on "experimental streams". While at Monash Harry had discussions with Ian M^{c}Kelvie and Paul Freeman on flow injection analysis.

Inland Fisheries Research Institute, Narrandera

Nestling quietly amongst the trees, perched on a gentle rise above the serene grasslands and river red gums on the Murrumbidgee River floodplain, lies the Inland Fisheries Research Station. During the fish breeding season over Spring and Summer the Station bursts into the full bloom of life, is inseminated by the fervour of urgent activity as tank by tank, the fish fulfil their procreative desires and fetishes. Then, as the offspring forsake their natal ponds for the far-flung corners of the state, the breeding grounds slide thankfully and blissfully into the recession of house cleaning and maintenance, patiently awaiting the arrival of warmer weather which once again gets the hormones flowing out of the fridge and into the fish to start the whole cycle of man-managed nature yet again.

So runs life for research staff on the Station as well, for as the last fish leave the Station and experiments are completed for yet another year, a fervour of anticipation courses vigorously through the veins until the results of the first analyses are available. This event signals the onset of a peculiar behavioural sequence which is characterised by withdrawal from social contacts with conspecifics, and outbursts of extraordinary vocalisations directed both generally and specifically at the miscreant computer that happened to deliver the results.

This year, social withdrawal occurred to a far greater extent than usual, with the emigration of Brett Ingram to some other province south of the border (but not as far as Tasmania!), and the annual winter migration of Stephen Thurstan, Ken Bock and Bill Moller. Brief periods of activity erupted with the arrival of Murray Revell, from Warrnambool Institute of Advanced Education. Murray did some studies on effects of

red gum extracts on activity levels in juvenile golden perch (more of that later) and the role of tannins.

University of Western Sydney (Hawksbury)

"Teaching's hectic here at the moment so research is scanty. That's my excuse anyway. The recent floods decimated the Hawkesbury/Nepean - a good opportunity to study post catastrophe recovery.

A number of post graduate students are busy at work (we think). Steven Sawtell at Coffs harbour is investigating *Culicoides* control in urban development in estuarine areas (subtitled - Nature fights back in canal development). Danda Sapkota is working out how effective slow gravel filters are at polishing effluent.

Fiona Harriss is attempting to characterise phosphorus mobilisation in constructed wetlands at Byron Bay. John Bavor is still mucking around with wetlands and sewage and most other things just about everywhere."

University of New England

Another three months of rain, snow, rain, rain and more rain. For the first time in the last 10 years everything is saturated and every drop of water that hits the soil runs off into creeks, paddocks and hitherto undefined wetlands. So its a great year for seeing ephemeral wetlands full! And now its essential that we all can swim!

Our seedbank sampling programme is well underway with our core samplers being modified weekly to cope with the increasing depth of water. Laurie O'Donnell has been enticed form his previous indoor soil analysis job to be our part time Junior Research Fellow and he and Kevin Theodore at present seem to be trying to become amphibious in order to cope with the hundreds of core samples we need from under metres of water.

Dorothy Bell, a Diploma in Science student has also been persuaded to get her feet wet and is doing a project on the phenology of aquatic plant species in a wetland as it dries down (if it does so this year).

Michelle Casanova and Margaret Brock have plans to make the most of this wet year by surveying aquatic plants, both charophytes and angiosperms in every new puddle and creek with the aim of getting some real idea of how aquatics lurk and survive in seedbanks, and wet crevices and cracks as well as in permanent water.

TRANSCRIPTS FROM THE WETLANDS SESSION AT JABIRU

Aims for ASL

Lots of work on wetlands is new and there is a lack of interaction. This meeting follows on from the book edited by McComb and Lake which was the result of a workshop held in Sydney in 1986. The workshop arose from the International World Wildlife Fund identifying wetlands as important.

That workshop addressed the following questions:

1. What is the state of the wetlands ?

2. Are they well conserved ?

3. What are the threats to wetlands ?

Defining a wetland.

Wetlands are not only swamps but encompass streams through to the marine littoral zone. It is counterproductive to delineate swamps alone as wetlands because it creates artificial boundaries.

There is no coordinated scheme for defining wetlands across Australia.

1. There is a need to start coordinating classification and inventory systems.

2. There should be proportional representation of wetland type in each state. At the moment wetlands of high aesthetic or wildlife value are emphasised. Periodic or temporary wetlands have been neglected. Often these are on private land and have no conservation status because they are ephemeral.

3. Types of research should be targeted. Research should be concentrating on the neglected wetlands, this duplication would be avoided.

4. Disturbance. We can not look at all forms of disturbance, but some are more important than others. For example grazing has a dramatic impact, but little work has been done on it.

5. Legal problems.

(a) The standard of Environmental Impact Statements should be elevated by asking developers for statistical monitoring.

(b) Many wetlands are on leasehold or private land. There needs to be powers for legal acquisition or management of wetlands on private property.

6. The lack of opportunistic research on wetlands that occur periodically - there are no facilities for studying these when they occur.

STATE-BY-STATE SUMMARIES.

Wetland research in New South Wales

Jane Roberts

This is a guide to wetland and wetland-related research in New South Wales. River and floodplains but not estuaries are included as appropriate to wetland themes.

Wetland research by state agencies mirrors their respective areas of interest and responsibility, so targets a specific group of organisms (e.g. ducks, fish and gums). Not surprisingly, the scope of research in universities, federal and research institutions appears wider.

Recurrent themes are: river regulation, its direct and indirect effects on target species; geo-bio-chemical processes, particularly those relevant to applied use of wetlands; water regime. Most research is couched in terms that will eventually benefit management.

National Parks & Wildlife Service does research in areas such as population dynamics, movements, breeding and feeding ecology of waterfowl. It includes wetland types little covered by other researchers, such as ephemeral and semi-permanent systems in the far north-west such as the Paroo and Narran Lakes (Kingsford).

River regulation and flooding events, their effect on river and floodplain species, and managerial options are a complex theme. Work in this area ranges from basic ecology to providing robust answers for managers. NPWS has a project on billabongs of the middle Murrumbidgee which aims to establish how river regulation affects habitat preferences and breeding success for a range of waterbirds (Briggs). The Forestry Commission, in

conjunction with MDBC and DWR of NSW, is doing watering trials on river red gums in Gulpa Forest along the Murray River, with the aim of making some first estimates of volume versus response (Thompson, Heinrich): associated with this is a field project on the behaviour of fish larvae in inundated areas (Gehrke). Responses of several fish larvae to flooding are being tested on experimental floodplains at Inland Fisheries Research Station (Gehrke). The effectiveness of Torrumbarry Weir as a fish passage is being investigated (Allen-Cooper).

Research and development of constructed wetlands to treat nutrient-rich wastewater has involved much process-oriented research. CSIRO Griffith has projects on physiology and morphology of tall emergents with respect to rhizosphere oxidation (Sorrell, Orr), microbial and chemical phosphorus speciation (Heritage, Lantzke). Development focussing on issues related to scaling-up is being investigated at Coff's Harbour (Blackwell, Chick, Mitchell). Interest in wetland treatment of wastewaters is very high resulting from controversy over ocean outfalls: the effectiveness of polishing treated sewage effluent is being studied at West Byron (PWD, Uni Western Sydney, Uni NSW) and of controlling non-point source pollution (DWR).

Water regime is also topical. DWR monitors waterbird usage and selected wetland attributes in relation to water regime. CSIRO Griffith has one project defining types of water regime using historical water level records from across Australia; linkage with actual wetland and riparian plant communities will be limited to the south-eastern corner (Roberts). The Bureau of Rural Resources with DWR has recently completed a feasibility study on use of satellite imagery for monitoring wetland water area as means of determining water regime (Johnstone, Barson). It is now involved in a desk study of wetland classification (Williams, Barson).

Institutions with an interest in wetlands and wetland plants (excluding estuaries and marine) are the University of New England, the University of Canberra and CSIRO Griffith. Research at UNE includes life strategies of (submerged) aquatic plants such as *Myriophyllum variifolium* (Brock) and some Charophytes (Casanova), and a PhD on waterbirds and wetlands of the Paroo (Maher) - this included wetland diversity, its causes and correlates, and queries the importance of top-down control of invertebrate community structure by waterfowl. CSIRO at Griffith has a strong background in aquatic plant physiology, plant (weed) management, the fate and effect of agricultural chemicals such as herbicides; pesticides are next in line (Bowmer). Research at the Water Research Centre of UniC has been mainly of an applied or managerial nature; for example, guidelines on design criteria for urban wetlands to minimise stormwater pollution (Cullen).

Within NSW, DWR assumes a policy-development and management guiding role, particularly in relation to inland wetlands, and is responsible for implementation of some state and MDBC initiatives (Wettin, Cross, Brady, Knights); the Shortland Wetland Centre

at Newcastle has a public educational role regarding wetlands in general; places such as Centre for Environmental Toxicology at the University of Technology Sydney, the SPCC, are involved in pollutant detection and measurement in organisms, water and sediment.

(*Editors note:* Wish we had the IRDSFA - the Internationally Recognised Dictionary of State and Federal Acronyms - for that one.)

Wetlands Research and Management in Victoria

Lance Lloyd

The term "wetland" means different things to different people and hence a synopsis of wetland research can only be undertaken after wetlands are defined. The definition used here includes all inland aquatic systems, both lentic and lotic. However, each agency and many workers use different definitions; for instance, the Victorian Government separates lentic and lotic habitats as wetlands and streams respectively. My personal view is that aquatic habitats exhibit a continuum of types but that defining and classifying wetlands assists in their study.

The following synopsis reflects my professional bias and knowledge base. I am sure there are many other projects that have been missed but what follows is intended to serve as a starting point for discussion.

Some current work:

Centre for Stream Ecology

Many projects are underway in this centre that are relevant to wetlands research and management. It now has a large staff (31 and 16 postgraduate students), a broad funding base (internal funds, State & Federal grants and consultancies) and 16 major projects currently underway. Most of the major projects focus on streams and are described in detail in the 1989 CSE Annual Report. The work encompasses both field and laboratory studies and focuses on various southern stream systems.

Three projects are listed here;

a) Organisation of benthic stream communities (Downs & Lake). Examines the factors maintaining species diversity in particular stream habitats. Field and laboratory studies in the Acheron River, southern Victoria.

b) Microbial ecology in Australian streams (Edwards, Hart & Campbell). This program aims at characterising bacterial communities. A field-based study in Keppels Creek and Acheron River.

c) Effects of increasing salinity on streams and wetlands (James & Hart). A field and laboratory study based in the Goulburn Valley - Shepparton Irrigation District.

Centre for Environmental & Applied Hydrology

Several projects are underway in this group which are relevant to wetlands. Three projects are illustrated here;

a) Environmental flow modelling (Gan & McMahon). Comparing established IFMs with Australian conditions and the development of new models to simulate and predict local conditions.

b) Hydrological effects of regulation on the River Murray in SA and alternative management strategies (Walker, McMahon & Stillwater). Study area is the Murray below the Darling confluence but work is based in Melbourne.

c) A stream ecologist's guide to hydrology (Gordon, McMahon & Finlayson). A manual designed to help aquatic hydrologists use hydrological information.

Museum of Victoria - Invertebrate Survey Group

This group's research projects deal with the ecology of invertebrates in stream and river systems in Victoria as well as providing a comprehensive taxonomic database for the state.

One current project (in collaboration with CSE) is:

a) Effects of physical disturbance on stream macroinvertebrate communities (Marchant, Lake & Doeg). Field based work concentrating on the Acheron River.

Murray Darling Freshwater Research Centre

The MDFRC undertakes a range of research on the River Murray and its floodplain habitats in both Victoria and New South Wales. The Centre is also large with a staff of 24 and many associated personnel and students. The list of projects undertaken by this group are too extensive to list here but cover topics such as river and floodplain ecology

in the fields of physical limnology, microbial and invertebrate ecology, macrophyte physiology, and ecology and taxonomy.

Rural Water Commission and Environmental Protection Agency

These organisations have several monitoring projects underway which are associated with water supply, rivers and dams (Croome, Chessman, Pettigrove, etc.).

Department of Conservation & Environment (formerly Department of Conservation, Forests and Lands)

Wetlands Unit

The Wetlands Unit has been set up in Melbourne to provide co-ordination and implementation of the wetlands conservation program in Victoria. Jan Shaw is Manager of the Unit which has ten staff covering areas such as conservation assessment, monitoring and research, economic evaluation, wetland hydrology, management plan development and the impacts of fire and grazing.

Arthur Rylah Research Institute

Wetlands and Waterbirds Survey of Victoria (Corrick, Smith & O'Brien). Survey of wetland types and waterbird usage in many regions in the state, most recently the team has surveyed the Goulburn, Broken and Campaspe catchments.

Wildlife planning projects associated with waterfowl management are underway. Individual projects are unknown to me but general information indicates these projects are relevant to wetlands in Victoria.

Fisheries research projects are also managed out of ARI and several of these are relevant to wetlands research. Koehn, Doeg and Milledge are undertaking a project to examine the effects of logging on fish and invertebrates in the Otway Ranges. Other projects underway include instream flow requirements for fish (Hall & Tunbridge) and other projects on planning for aquaculture, freshwater fisheries and trout survey.

Snobs Creek

Research at Snobs Creek (Cadwallader, Gooley *et al.*) has concentrated on the reproductive biology and early life history of Murray Cod and Macquarie Perch as well as exotic salmonids.

Kaiela Research Station

Kaiela Research Station at Shepparton has undertaken work on habitat requirements of native fish (Anderson & Morison), effects of stream salinity on fish (McGuckin) and the role of flooding for Murray fish (MacKinnon).

Benalla region

Benalla region of C&E has also a number of wetland research and/or management projects underway. These include:

a) Studies of the role of flooding on macrophyte communities (moira grass swamps) and work on the effects of grazing on plant communities in Barmah Forest (Burgess & Ward).

b) Studies of wetland water requirements along the mid-Murray floodplain (Lloyd, Atkins, Beovich & Warner).

c) Studies of the effects of salinity on wetlands and the development of salinity management plans in the Shepparton Irrigation District (Robinson & Sherwood).

Other projects in the region deal with management of specific wetlands (general - Leitch; reserves - Tedder, Douglass, Felton, Garner) and wildlife (Davidson, Brodie).

A range of management activities are underway in the region, funded by wetland initiative grants under the Wetland Conservation Program. These include the Western Wetlands project in the Melbourne region and survey, assessment, management works and land acquisitions in various other regions throughout the State.

Future Opportunities

Obviously this is a relatively superficial overview of some of the activities occurring in the state of Victoria but clearly it leads to some obvious future opportunities. Co-operation and collaborations could occur on both intra- and inter-state levels. It is vital that information is shared amongst different research groups and between states.

This co-operation and information sharing would be facilitated by a number of actions. Clearly this workshop is an important initial step and it should be followed up by a detailed inventory of current work in the wetlands field.

Perhaps a further way that collaborations can be facilitated is to list projects together on the basis of similar geographical area (drainage basin, e.g. Murray-Darling or

sub-catchments), similar subject types (e.g. all projects dealing with floodplain ecology) biotic groups (invertebrates, plants, etc), or by the processes that are being studied (e.g. flooding, salinity, etc.). This could be achieved most efficiently on a computer data base to enable each worker to find like-minded research projects and researchers. This would form the basis of a valuable resource document for researchers and managers alike.

Other steps might include the formation of a distinct sub-group within ASL that can regularly communicate on wetland matters either on a regional, national or subject basis. The group might also attempt to influence state bodies to adopt a common definition and classification of wetlands. Other co-operative ventures such as the development of a common data-base for storing wetland data and guides to the sources of funding for wetland work.

Wetland Research at the Murray-Darling Freshwater Research Centre

Paul Boon

Limnological research at the MDFRC (obviously now a state to itself. When did you guys secede? - *Eds.*) is divided into two main programs; i) Limnology of Regulated Rivers, and ii) Floodplain and Wetland Ecology. The second program is, itself, divided into two core projects: i) Limnology of Billabongs, and ii) Ecology of Wetlands and Their Use for Wastewater Treatment. Most research in the second core project, the Ecology of Wetlands etc, is conducted at CSIRO (Griffith) under the direction of Dr Kath Bowmer, so will not be discussed further. AT the MDFRC, most research on wetlands is conducted under the banner of the Limnology of Billabongs project, directed by Dr Terry Hillman.

Current research on billabongs includes work on physico-chemical limnology, bacterial ecology, macrophyte-bacteria interactions, zooplankton ecology and macroinvertebrate studies. Five billabongs near Albury-Wodonga (Ryans 1 and 2, Mildrens, Rushies, Snowdens) have routinely been sampled for a range of physico-chemical parameters (e.g. Ph, O_2, conductivity, nutrients such as N and P, chlorophyll-a etc) over the past 10 years. This monitoring is now being concluded, in favour of analyses linked to specific ecological studies.

Research on bacterial ecology is conducted by Dr Paul Boon, Mrs Alison Mitchell and Mr Oliver Scholz; the major topics are studies of organic matter degradation in the water column and on submerged wood, and a comparison of bacterial assemblages in paired river/billabong sites. In addition to sites near to Albury-Wodonga, billabongs on the mid-Murray, Murrumbidgee and Darling Rivers are sampled. An additional project, including the above personnel with Dr Brian Sorrell and Mr Greg Raisin, is examining the

interactions between submerged and emergent macrophytes, sediment biogeochemistry (especially CH_4 flux) and bacteria in the sediments of Ryans 1 billabong.

Zooplankton ecology is centred around weekly sampling of Ryans 1 and 2 billabongs by Dr Russell Shiel. This sampling generated a two-year quantitative record of seasonality in planktonic and littoral microfauna. Some research by Drs. Boon and Shiel has recently been completed on the consumption of bacteria by rotifers in billabongs.

Drs Hillamn [*sic*] and Dan Faith are currently analaysing data on macro-invertebrate composition from a range of billabongs, including some near Albury-Wodonga and others along the Murray and Darling Rivers. A second major study on billabong macroinvertebrates is that comparing closely-related river and billabong fauna of the Odonata, Ephemeroptera, Trichoptera and aquatic Lepidoptera. Dr Andrew Boulton is expected to commence research in 1991 on the interactions between macrophytes and macroinvertebrates in billabongs.

Wetland research in South Australia

Naomi Rea

Information for this talk came from the literature and a questionnaire sent to 24 government, tertiary, private and conservation bodies. The use of pie diagrams (Que? Not provided with this text - *Eds.*) summarises this information and although results become hidden, the aim was to view the overall situation of wetland research in South Australia: to see what was being studied, where, by whom and for what purpose. In this way we can get an idea about where the direction for this research is coming from and why we know a lot about some things and very little about others.

It might first be useful to introduce the wetland environment and infra-structure of wetland study in South Australia. The climate and landform vary considerably from the north to the south. In the northern arid region, wetlands are often ephemeral, driven by erratic thunderstorms interspersed by long dry, hot spells. More permanent waterbodies are in contact with groundwater aquifers such as the Mound Springs or associated with drainage from the Channel Country, such as the Coongie Lakes system. Moving south, the rainfall becomes more consistent and the hot dry summers separate cool damp winters. Wetlands in this temperate and semi-arid zone experience marked fluctuations in water levels and the shallowest of these will alternately wet and dry. Associated with the Murray River are numerous floodplain wetlands, which are often characterised by high turbidities. The South-East was once a vast area of more fresh and more permanent wetlands than elsewhere. Due to drainage only about 10% of these remain. On Kangaroo Island, Eyre, York and Fleurieu Peninsulas and the many ancient ranges throughout the state, there are

different wetlands again, unique to these areas. Salt lakes and clay pans are associated with coastal areas and the inland. These wetlands are often dominated by samphire vegetation which must tolerate hypersaline and drought conditions.

Much of the work in South Australia has arisen from several reports and their recommendations over recent years. In 1978, a report titled The wetlands of the South-East of South Australia (Jones 1978) by the Nature Conservation Society of South Australia led to the South-East Drainage Board's environmental impact study The effects of drainage on the South-East of South Australia in 1980. Their recommendations led to the establishment of the Cardwell Buckingham Committee that undertook and supported a number of projects in the early 1980s. Similarly, the South-East Wetlands Committee was set up by the Department of Environment and Planning and their report Wetland Resources of the South-East of South Australia in 1984 also led to many projects. Thus it is pretty clear where the impetus for study on the South-East wetlands came from. Later in the 1980s, the emphasis switched to the Murray River and reports such as the South Australian River Murray wetlands working party report Enhancing Wetlands in 1988 has instigated further studies in this region.

What type of wetland is being studied? Given the nature of the South Australian environment it is not surprising that the most commonly studied wetland is the fresh to brackish, semi-permanent type. Some studies included a range of sites so there is some overlap between this group and the more permanent freshwater wetland. Salt lakes and clay pans received less attention and rock waterholes in the Gawler and Flinders Ranges and ranges in the North-west have missed out altogether.

Where are these wetlands? The predominance of studies on South-East and Murray River wetlands corresponds with the large proportion of studies on the fresh to brackish semi-permanent type and freshwater permanent types respectively. Although it is the quality of studies not the quantity that determines how well understood these systems are, the big differences here suggests there is less known about wetlands outside these regions.

What are these studies looking at? The subjects chosen avoid topics such as diversity and pattern, decomposition, nutrient dynamics and production, and demography for reasons which will be given later. Vegetation was the most common theme, followed closely by waterbirds and invertebrates. Water regime also received a fair amount of attention, not just from a biological point of view but from an engineering and management perspective. The effects of human disturbance, stock grazing and wetland rehabilitation has received a small amount of attention.

When were studies undertaken? An equal proportion of studies were completed in the periods up to 1978 and between 1979 and 1981. Thereafter an equal

proportion of studies were undertaken in the consecutive 3 year periods till 1990. The activity of the 1980s reflects action taken on the recommendations made by the government reports mentioned earlier.

By whom are these studies undertaken? Government departments and tertiary institutions are doing most and approximately equal amounts of wetland research in South Australia. Private and conservation groups have made approximately equal contributions yet less significant.

Is this research generally available? On the whole most studies are published, equal amounts in public journals and books and government internal reports. This may well correspond with the work being done by tertiary and government departments respectively. Because of the non-statistical nature of this data, this is a tentative conclusion. For example, the work of tertiary bodies might just as well be distributed between the "to be" or "not to be" published categories.

Fundamental or applied research? Lastly the studies were divided between fundamental versus applied research; whether it was documenting or surveying work versus experimental and whether it was undertaken for the purpose of management or conservation. These divisions are obviously not clear cut and there is some overlap. For example, ecological surveys are often for the purpose of management and conservation. Also the boundary between fundamental and applied research can be hazy, especially in an era where fundamental science is usually funded only when the practical application has been shown. The content of recent ASL conferences reflect lots of applied work, in contrast to the past where less pressing issues were addressed.

In SA applied research is twice as common as fundamental. Surveys or documents work is about 6 times more common than experimental lab or field work and the purpose of these projects is more or less evenly divided between management and conservation.

Of the permits given out by the Government to undertake scientific research in a reserve or to collect protected species, the number associated with wetland research is very small and has not increased in proportion with the increase in scientific research in general.

Conclusion. The approach of choosing broad groups for each question was due partly to the observation that there was little rigorous science underway. This may be due to a small population with a very small proportion of aquatic ecologists working in a large state with a wide range of wetland types. It more likely reflects the minor role the wetland habitat plays in peoples thinking. This applies to researchers and the approach to land management by the various authorities.

One of the main forces that drive our wetland systems is the water regime. This is probably relevant elsewhere in the country as the extremes in seasons in southern Australia are also evident for example in the wet/dry tropics of the north. Many of the premises of aquatic ecology sprung from northern Europe where stable water levels and permanent waterbodies are typical. These are inappropriate theories and models for most of Australia, except perhaps for the eastern sea-board. Fluctuations in water levels and the ephemeral nature of wetlands have important implications. For example, biota must be able to tolerate diluted floodwaters and highly concentrated standing water that follow summers of high incident solar radiation. The wet/dry cycle will also affect nutrient release and recycling and the switch from anaerobic to aerobic conditions in the substrate.

Recently there are been much interest in examining aspects of wetland water regime in this state. Jim Puckridge's work on recruitment of floodplain fish assemblages is based on the unaltered flooding regime in the Cooper Creek, information that is unavailable from the highly regulated Murray River. The River Murray Lab. in the Zoology Department of the Uni. of Adelaide has several projects involved with the hydrological regime of the Murray and botanical work at Bool lagoon in the South-East, by myself and other students in the Botany Dept, has concentrated on the influence on relevant aspects of the water regime on various ecological aquatic plant parameters.

Wetland research in Queensland

Angela Arthington

The following is a brief account of wetlands research and related activities presently underway in Queensland. It has been assembled from personal knowledge of the activities of various groups and institutions, not by survey or systematic searches of the literature, although this could be done if ASL wishes to develop this initial report. I apologise to any group or individual whose research is not adequately noted.

University of Queensland

Wetlands research within the Department of Zoology is mainly concerned with aquaculture, especially freshwater aquaculture and the integration of aquaculture and agriculture. An experimental system has been established at Moggill Farm, Brisbane. Other research is concerned with the biology of freshwater and marine crustaceans, the ecology of Morton Bay and related topics.

Queensland University of Technology

The Department of Biology and Environmental Science is engaged in several projects focussed on aquaculture, the development of artificial diets for cultivated fish, the genetics of wild and cultured stock and the use of sterilised male techniques to produce stocks of species which might cause environmental problems if allowed to become feral. Several members of staff are interested int he ecology of periphyton and algae and problems of eutrophication in freshwater systems.

Griffith University

The Centre for Catchment and In-stream Research (CCISR) undertakes a wide range of limnological research in the following broad areas: ecology of rainforest streams, the impacts of agricultural land use on stream ecosystem structure and function (including the use of artificial stream and pond ecosystems for experimental research on effects of pesticides), Chironomidae as biological indicators (with Peter Cranston, CSIRO), the ecology of impoundments and impounded rivers, the community ecology of river fishes, in-stream flow allocations, the ecology of introduced fishes (especially Tilapia and Mosquitofish), and gene flow between populations of stream invertebrates and fish (didn't know the two interbred - *Eds.*).

Research specifically dealing with wetlands is limited. CCISR currently has a one-year project underway to examine the effects of recreational use on the water quality and algae of freshwater dune lakes and streams on Fraser Island. Associated with this is a consultancy to advise the Fitzgerald Inquiry on the ecology of Fraser Island's freshwater wetlands, to assess impacts of recreation on dune lakes and to advise on wetland management. Similar advice has been given on the wetlands of Moreton Island and North Stradbroke Island. Related to these studies are contributions to submissions to place various areas on the Register of the National Estate.

CCISR is the recipient of a grant from the endangered Species Program, funded by the ANPWS, to study the biology and ecology of the Honey Blue-eye, *Pseudomugil mellis*, and to advise on a strategy for its conservation and management. The research is currently focused on fish assemblages in the Noosa River and Blue Lake, North Stradbroke Island. A management strategy for this "vulnerable" fish will necessarily emphasise habitat protection.

Dr. Stuart Bunn has initiated a collaborative study with the MDFRC, using stable carbon isotopes to examine carbon fluxes in billabongs. Similar work has begun at Griffith University.

University College of Central Queensland (formerly Capricornia CAE)

Dr. Peter Mackie has conducted many years of research on the ecology of invertebrates in the Fitzroy River. Other colleagues have investigated the ecology of barramundi (yummy work - *Eds.*) and other fishes in this river system. The effects of mining on aquatic plant diversity and distribution are being studied in local streams and rivers.

James Cook University

The Australian Centre for Tropical Freshwater Research has an extensive research program on freshwater systems, ranging from studies on small rainforest streams (e.g. Birthday Creek) to the ecology of the Burdekin River and its coastal wetlands, particularly the Barratta Creeks and swamps. Details of JCU limnological research were outlined at ASL, Jabiru, by Dr. Bob Congdon. This centre is also active in consultancy work and provides analytical services for water quality evaluation.

Queensland Department of Environment and Heritage

The Department is developing an inventory of Queensland wetlands, using remote sensing techniques and geographic information systems, especially ARCINFO. A classification scheme has been suggested for this work but concern has been expressed that freshwater wetlands need more refined definition. The project will initially concentrate on coastal wetlands in the Townsville area, but similar work has begun at Cape York and in the Gulf of Carpentaria.

The DEH is developing an environmental protection strategy for the waters of Queensland. A comprehensive list of the beneficial uses of waters that are worthy of protection will be identified and for each BU, relevant water quality criteria will be defined. This approach is likely to generate a research program aimed at developing water quality criteria relevant for Queensland (e.g. studies on turbidity are a possibility). Many other issues concerning the maintenance of aquatic ecosystems and habitats will receive attention as part of this initiative.

Queensland Department of Primary Industries

The QDPI Fisheries Branch is engaged in an expanded program of studies and management initiatives in freshwater environments, under the leadership of Dr. Peter Jackson. One of the new initiatives has been a one-day seminar to bring together all institutions and persons with involvement in freshwater research and management in Queensland. Although generally restricted to southern Queensland, this seminar demonstrated the growth of institutional involvement in limnology in general, and fishes in particular.

Water Resources Commission

The WRC supports a wide range of investigations on issues of water resource evaluation and management. An environmental group formed within the Planning Division is currently developing environmental policies and strategies for the Commission. Issues of concern to the Commission are the environmental impacts of large dams and river improvement works, the maintenance of river fish stocks, the design of fish ladders, and water quality issues. A 4-year environmental study of the Bjelke-Petersen Dam, near Murgon, SE Queensland, has been conducted by CCISR. A continuing phase of this study began in July 1990 and will develop recommendations for allocating in-stream flows, based on the results of the earlier research.

CSIRO Cleveland

The CSIRO Marine Laboratories at Cleveland, SE Queensland, are a major CSIRO marine research facility with three major research thrusts: aquaculture, estuarine and coastal zone systems and marine systems. Wetlands research has an emphasis on seagrass ecology, primary productivity, microbial processes and rehabilitation of seagrass communities. There is a limited involvement in freshwater research but there is a developing interaction between this laboratory and CCISR. The focus of this development is likely to be energy and nutrient fluxes in rivers and the significance of energy export to the energy budgets of estuarine, mangrove and coastal ecosystems.

CSIRO Division of Entomology

The Long Pocket Laboratory of the CSIRO Division of Entomology has a continuing interest in the ecology and integrated management of aquatic weeds. Insect biological control programs are a major strength of this group, and the major pest species being investigated are water hyacinth and Salvinia.

Australian Institute of Marine Science

The Institute has a limited involvement in freshwater research but is concerned with sediment, nutrient and contaminant export from river systems and their impacts on coastal and marine systems.

Wetland Studies in Western Australia

Jenny Davis

1. Effects of altered water levels on plants
   * (*=who, where) McComb and Froend; Murdoch
   $ ($=who pays) AWRAC, Water Authority, EPA

2. Life history strategies of the aquatic fauna and water level fluctuations in Perth wetlands
   * Balla and Davis; Murdoch
   $ AWRAC, Water Authority, EPA

3. Wetland classification on the basis of water quality and invertebrate community structure
   * Davis, Rosich and Bradley; Murdoch and Water Authority
   $ AWRAC, Water Authority, EPA

4. Wetland/Aquifer interactions
   * Townley and Turner; CSIRO
   $ AWRAC, CSIRO

5. Assessment of the value of different types of wetlands for waterbirds using the Swan Coastal Plain
   * Halse and Vervest; CALM and RAOU
   $ AWRAC, CALM, Water Authority, EPA, DPUD

6. Biomanipulation of water quality in an urban wetland
   * Lund; Murdoch

7. Investigations into control of nuisance midges in urban wetlands
   * Davis, Pinder and Trayler; Murdoch
   $ CALM, EPA, SPC, Local Government Authorities

8. Management plans for urban wetlands
   * various Local Government Authorities

9. Water ecology and vegetation of the AMC Wetlands Centre, Capel
   * Chambers, Gordon and McComb; UWA and Murdoch
   $ AMC Wetlands Centre

10. Establishment of wetland plants
* Chambers and McComb; Murdoch
$ MERIWA, AMC Mineral Sands, Westralian Sands, ALCOA

11. Studies on the Peel-Harvey and South Coast Estuaries
* Humphries, Hodgkins, Bott; EPA, Chambers, McComb, Lukatelich; Murdoch
$ EPA

Wetland Research in Tasmania

Pierre Horwitz

1. Growth rate of vegetation in wetlands in response to disturbance
* Stuart Blackhall; Parks, Wildlife and Heritage
$ National Estate of Tasmania

2. Flora and fauna of the Upper Derwent Estuary
* Pierre Horwitz and Greg Blake; University of Tasmania
$ Australian Newsprint Mills

3. Water quality, hydrology, fish biology in the Upper Derwent estuary
* Peter Davies and Stephanie Kalish; Inland Fisheries Commission
$ Australian Newsprint Mills

4. Ecology of peat development (dating C^{14} and pollen), peat mound development
* Michael Pemberton
$ Parks Wildlife and Heritage, WHA

5. Effects of fire on peat and peat erosion
* Michael Pemberton
$ Parks Wildlife and Heritage

6. Fuel accumulation in buttongrass plains and the effects of fire
* Dave Ziegler, Tim Rudman and Jayne Balmer
$ Parks, Wildlife and Heritage, WHA

7. The impact of drainage on subterranean freshwater fauna and water quality
* Pierre Horwitz; University of Tasmania
$ Australian National Parks and Wildlife Service

8. Ecology and conservation of Tasmanian Sphagnum peatlands
* Jennie Whinam; University of Tasmania
$ University of Tasmania, National Estate of Tasmania

TOWARDS A WETLAND CLASSIFICATION SYSTEM

Michele Barson

A classification system needs to be based on physical, chemical or biological data, that is primary, not derived data (e.g. "conservation value"). It needs to be useful for wetlands at a national level. We also need a minimum data set agreed to by the states so we can begin to say something about our wetland resources at a national level. Data bases being established by the States also need to have standardised approaches to geocoding for site location.

Research funding agencies should also be asked to ensure that workers undertaking wetland field studies provide the minimum data set for their study sites to the appropriate State data base.

It should also be noted that we already have a data base for wetlands research. Streamline, the national water data base includes wetlands research - both research in progress and bibliographic material. I will do a search of current projects and prepare a list for the next ASL newsletter (see last Newsletter - *Eds.*).

In relation to the proposal for an Australian wetlands inventory being discussed by Max Finlayson, we need to ensure that Australian scientists have a major input rather than accept something developed overseas which may not be useful for Australian conditions as we could make it.

We need a directory of Australian wetlands.

We need a work inventory so that we know what we have.

Why were the wetlands not managed in the past and what is the cost of the loss of these areas. Often there are financial reasons for wetland loss. Wetlands have not been valued in the past. But establishing the value of wetlands in real terms is hard. It requires basic research.

We know enough to manage wetlands. We need to train people to manage the environment.

The wealth of Australia allows wetlands to be used for conservation alone. However, land use issues will become more important.

We need to look at the land use issues to determine what wetlands are being used for, and the problems that result from overlaps of use. We need to develop guidelines for multiple use. Unfortunately, the people who make decisions have no idea about wetlands.

Frog pioneers

The Greenhouse Effect hits a German Stream - Breitenbach, near Schlitz

BREITENBACH - THE GERMAN "ACHERON RIVER"

Breitenbach (English: "Widebrook"), flowing into the River Fulda not far from the picturesque medieval castle-town of Schlitz in the Upper Hessen Region of Germany, is perhaps one of the most thoroughly studied bodies of flowing water in the world, in spite of its modest three kilometre length.

Professor Dr. Peter Zwick, Director of the Research Institute for Limnologie, likes to emphasise that the projects of the Max-Plank-Institute in the idyllic surroundings of Schlitz enjoy a foremost position in the scientific world and lure students and world-recognised limnologists from everywhere to Schlitz's castles and forests. The laboratory was founded in 1951, with the research task of taking "limnological inventory" of the River Fulda and surrounding waters. Previous knowledge of flowing water ecosystems was "very insufficient", explained Dr. Zwick, with no European river having a complete catalogue of its relevant animal and plant life. Today, much information and knowledge about living organisms in rivers and streams, and particularly about the multitude of insect species, stand at the disposal of ecological research. A "considerable portion" of this new knowledge can be directly attributed to the laboratory in Schlitz.

Imagination and fantasy have characterised much of the research in Schlitz. Professor Dr. Joachim Illies, Founder and original Director of the Institute, developed a special and quite novel method of ascertaining which species of insects, and in what numbers, emerge from the water for their adult life. Prof. Illies built glass "green houses" directly over the stream Breitenbach (see opposite photo) where the insects emerging from the watery element into the air could be captured, identified and counted. The Breitenbach-house enjoyed, for example, a transitory insect population of 248,932 during 1970.

In nearly 40 years at Schlitz, the Institute has published over 750 original scientific papers. Like the flowing waters, new discoveries and ever more refined methods have meant ever changing goals and challenges for the laboratory. Prof. Zwick doesn't hide that the immense growth of factual knowledge in the past has brought burdens as well as inspiration to the research work. "Scientific success is inspiring, but the countless data which has to be ordered and interpreted can be very burdening." A great deal of work is done in obscurity, time spent intensively with details, but this isn't a sign of estrangement from the world or an enjoyment of the unimportant, explained Prof. Zwick. Fundamental research which makes possible the exact analyses of larger bio-ecological contexts becomes ever more important in times of ecological crisis (Right on! - *Eds.*).

Florian Illies

ON THE SECRETARY'S DESK

FASTS Fees

At the end of June this year I received a letter from FASTS indicating that they were increasing their annual per capita fees to $3.80 and that henceforth the annual fee would increase according to a "conservative CPI". I replied as follows:

"The ASL currently pays a fee of $2.50 per member to FASTS. After the request from FASTS last year for a per capita fee of $3.50 I wrote explaining that the members of the ASL had voted at a recent AGM to retain full membership of FASTS at the old fee of $2.50 or, if this was unacceptable, to become associate members at $0.35 per head. The reply I had indicated that FASTS was happy to retain us as full members under the old fee. Your new request to increase the per capita fee to $3.80 will also have to be voted on at an AGM. Unfortunately we have just held our annual meeting and our next meeting will not be until July 15 next year. Thus for the current financial year it is not possible for the ASL to meet your request."

By the time the society does vote on this issue it is likely that the required fee will have increased again. The executive will discuss this issue during the year but ultimately the decision will be up to members because the only way the society can pay these fees is by increasing our own subscriptions. My aim in providing these details is to enable members to consider the issue before voting on the level of ASL subscriptions at the next AGM.

Limnological Equipment

I have recently received a letter from Mr Gavin A. Hills, the Managing Director of Imbros Pty. Ltd., notifying the society that his company is the Australian representative for an English company, Duncan & Associates, who supply a wide variety of limnological apparatus. A catalogue is available from:

Imbros Pty. Ltd.
7 Chesterman Street,
PO Box 427, Moonah TAS 7009

The type of gear supplied by Duncan & Associates includes:

Sediment corers
Fish survey nets - gill, fyke, stop nets
Freeze corers

Air-lift sampler
Grabs and dredges
Various macroinvertebrate samplers - Surber, Hess

and much more. I have not seen any prices but for those of you who find it hard to get specialised gear this company could be the answer to your prayers.

Richard Marchant, Secretary

60 MINUTES

Also in order to let you know what sort of issues are likely to be around in the future, we will be publishing the minutes of the regular executive meetings.

Executive meeting. 19 April 1990. Four Seasons Hotel, Jabiru, NT

Present: R. Marchant, R. Oliver, R. Croome, J. Davis, R. Hyne, A. Pinder, A. Arthington, S. Bunn.

Apologies: M. Hart, R. Norris, P. Davies, C. Heath.

1) Computer: at the last executive meeting it was decided that M. Hart should buy the Macintosh computer she needs to keep the membership details and the accounts. With the computer it should be easy to keep membership lists up to date. Also acknowledgments should be sent to new members.

2) Incorporation: Secretary reported that the Society was now incorporated. The question of insurance for the society was still not settled and would be taken up with M. Hart & the Society's accountants.

3) 1991 Congress: this will probably be held at Marysville but details still have to be obtained. If this location turns out not to be suitable then Erskine House at Lorne is still a possibility.

4) Workshops: the President (R. Oliver) suggested the interest from the Society's saving accounts should be used to support workshops. The executive agreed this was a reasonable way to use the money but it was clear that a set of guidelines for holding such workshops was needed. R. Oliver promised to provide such guidelines.

5) A letter written by the President to AWRAC was circulated. This letter criticised aspects of the organisation and the priorities of the Land and Water Resources Research and Development Corporation which will take over current AWRAC activities on July 1,1990.

6) S. Bunn suggested the Society should be kept informed by the ARC on the composition of panels judging research proposals. He will write (in his capacity as the next ASL President) to the ARC about this.

7) It was suggested the Society should have more contact with AMSA. This will be left to the next executive.

R. Marchant, Secretary

(*Editors note:* Just how did this S. Bunn character know he was going to be the next president? Or have these minutes been changed after the AGM? Questions may be asked? Maybe Derryn should hear about this?)

Executive meeting, 22nd April 1990, 7.00pm. Jabiru, NT.

All new executive present.

1. Secretary & treasurer will investigate Warburton or Powelltown as sites for the next congress.

2. Conference guidelines: these will be drawn up by R. Oliver and others. Possible items for inclusion could be: length of talk restricted to 15 mins; only one oral presentation per participant; only one set of abstracts to be produced; penalty for failure to inform organisers of inability to attend & present paper; guidelines for poster presentation; registration for student prize to be placed on registration form.

3. Nominations for the Jolly Award should be sent out with the Annual Subscriptions. This year's nominations would close by June 30th.

4. Secretary is now Secretary of the Jolly award and should gather all correspondence in one file.

R. Marchant, Secretary

ANNOUNCEMENTS

STREAM HYDROLOGY WORKSHOPS

The Centre for Environmental Applied Hydrology will be presenting two workshops on stream hydrology in January-February, 1991. Dr. Robert Newbury, a stream hydrologist from Canada who led the Centre's 1989 workshops on habitat and hydrology, will be directing both workshops.

Workshop A: Habitats and Hydrology, is a 3-day workshop similar to the November 1989 workshop. Participants will gain hands-on experience in measuring the hydraulic geometry of streams and will learn methods of describing stream habitats at a catchment, reach, local and boundary layer scales.

Workshop B: Stream Rehabilitation is a 4-day workshop which will include tours of stream sites where rehabilitation work has been carried out, and sites where work is required. Participants will receive training in biological habitat requirements and stream rehabilitation techniques.

For further information, please contact Ms. Nancy Gordon, Centre for Environmental Applied Hydrology, Dept. Agricultural Engineering, University of Melbourne, Vic, 3052. Tel: (03) 3446641.

INTERNATIONAL CONSORTIUM FOR SALT LAKE RESEARCH

The international Consortium for Salt Lake Research (ICSLR) is an informal grouping formed in 1989 to foster research on, interest in, and the conservation and economic use of salt lakes. It receives advice from an international panel of co-directors, and issues SALINET which *inter alia* includes a directory (updated as occasions demand), information on meetings of interest, details of recent scientific papers on salt lakes. Mainly by means of SALINET, ICSLR aims to aid communication, collaboration and coordination between scientists, managers and others interested in the biology, conservation, hydrology, geology, chemistry, physics and economic use of salt lakes.

There are no fees for participation, and SALINET is issued free of charge. ICSLR is supported entirely by donation. Intending participants, or those who wish to receive SALINET, should write to the Executive Co-directors whose addresses are given below.

General Correspondence: Professor F.P. Conte, Department of Zoology, Oregon State University, Corvallis, Oregon 79331, USA

or Professor W.D. Williams, Department of Zoology, University of Adelaide, GPO Box 498, Adelaide, SA 5001, Australia.

SALINET correspondence: Professor W.D. Williams, Department of Zoology, University of Adelaide, GPO Box 498, Adelaide, SA 5001, Australia.

Telephone: (618) 228 5847
FAX: 618 223 5817
Telex: UNIVAD AA 89141

TRICHOPTERA TAXONOMIC WORKSHOP

After the success of the Mayfly, Water mite and Chironomid Taxonomic Workshops, the Murray-Darling Freshwater Research Centre will hold another workshop in February 1991. The workshop will cover adult and larval taxonomy of Australian Trichoptera and the guest speakers will be Arturs Neboiss, John Dean and David Cartwright. The format will follow that of the former workshops with seminars on the operation of the new caddis keys and specimen examination sessions.

For further information please contact: John Hawking, MDFRC, P.O.Box 921, Albury, NSW 2640 Phone 060-431002

COLUMN INCH

From the FASTS Newsletter No. 37. July-August 1990. Each of the FASTS Newsletters has a section called "Column Inch" which summarises what FASTS think is the most important news for its members, and we will be publishing these in the future.

"Contributing to policy development, FASTS met with Simon Crean, Minister for Science and Technology, in June to raise issues such as shortages of skilled personnel, award restructuring which may alleviate this in the long-term, and the need for more post-graduate awards. The minister undertook to follow-up FASTS concerns directly or through the P.M.'s Science Council with relevant Ministers.

"The Minister agreed to meet with FASTS Board on 20 August in the morning. During the afternoon of that day, the Board will meet with the Shadow Minister for S&T, Peter McGauran.

"The Coalition over the next year or so will be reworking its policies, and is seeking wide consultation. Dr. Hewson, the leader of the Opposition, wants these policies to be cohesive, and so he has set up greater interaction amongst Shadow Ministers through management Committee Structures.

"FASTS Member Societies should take advantage of the opportunity to have input in policy development either directly, or through FASTS Board members. This will be the first of such meeting. Continued liaison will be maintained."

BLASTS FROM THE PAST

Selected extracts from ASL Newsletters 5 and 10 years ago:

Volume 18(2) 1980 - From the Editorial by Robert White: "The exact publication dates ..." of the Newsletter ... "will depend on a supply of items from members (again sadly short in this issue) ... Putting the Newsletter together is a difficult task which could be made much easier by members putting pen to paper and letting me have that news, requests, moans, etc. Remember, I did say I would open a 'Letters' section - all I need are the letters!" (Sounds familiar? - *Eds.*)

Volume 23(1) 1985 - From the News and Views section: "Dr. Arthur Burch, President of the Australian Academy of Science, was highly critical of the 1984 Federal Budget for science. He stated that the Australian Government had a 'contemptuous incomprehension of the long-term aspects of science ... Without the results of science in the last 150 years, Australia would be still socially about the subsistence level of the days of Governor Macquarie ... It is the science of today which results in capabilities in twenty years time ... As one example of inept government decisions, the funding of the Australian Research Grants Scheme is about half what it should be ... The pity is that the sums of money required are virtually statistical errors in some other budgets." (Sounds familiar? Who was it that said "Plus ca change, plus c'est meme chose" - *Tim.* Probably someone French - *Leon.*)

LIMNOLOGY BIBLIOGRAPHY [Vol. 28(3) 1990]

1988

BUNN, S.E. 1988. Aspects of the functional organization of streams of the northern jarrah forest, Western Australia. *Verh. Internat. Verein. Limnol.* **23**, 1388. [Abstract]

PONDER, W.F. 1988. *Potamopyrgus antipodarum* - a molluscan coloniser of Europe and Australia. *J. Molluscan Studies* **54**, 271-285.

PONDER, W.F. & G.L. CLARK, 1988. A morphological and electrophoretic examination of "*Hydrobia buccinoides*" a variable brackish-water gastropod from temperate Australia (Mollusca: Hydrobiidae). *Aust. J. Zool.* **36**, 661-689.

1989

BUNN, S.E., P.M. DAVIES & D.H. EDWARD, 1989. The association of *Glacidorbis occidentalis* Bunn and Stoddart, 1983 (Gastropoda: Glacidorbidae) with intermittently-flowing, forest streams in south-western Australia. *J. Malac. Soc. Aust.* **10**, 25-34.

BUNN, S.E., D.R. BARTON, H.B.N. HYNES, G. POWER & M.A. POPE, 1989. Stable isotope analysis of carbon flow in a tundra river system. *Can. J. Fish. Aquat. Sci.* **46**, 1769-1775.

DEAN, J.C. & S.E. BUNN, 1989. Larval descriptions of the Hydrobiosidae, Philopotamidae, Hydropsychidae and some Ecnomidae (Trichoptera) from south-western Australia, with notes on biology. *Aust. J. Mar. Freshwater Res.* **40**, 631-643.

PONDER, W.F. 1989. Mollusca. *In* W. Zeidler & W.F. Ponder (Eds) *Natural History of Dalhousie Springs*. South Australian Museum, Adelaide: 71-77.

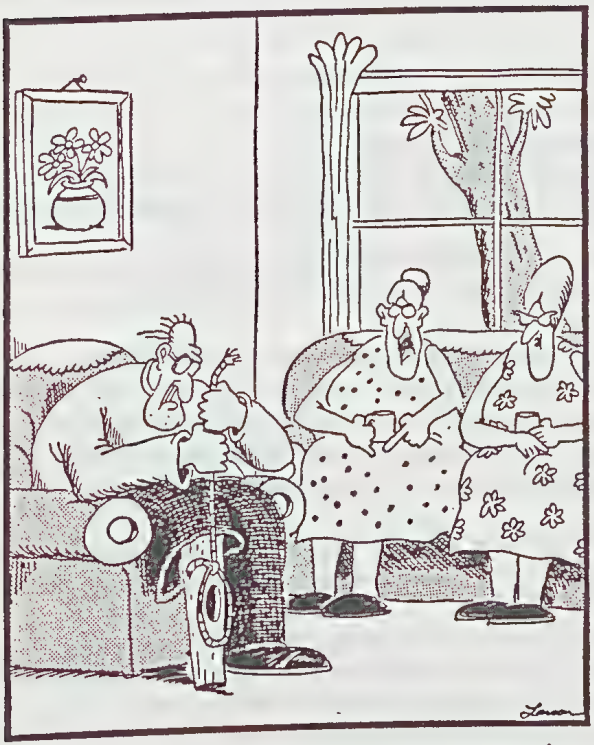
PONDER, W.F., R. HERSHLER & B. JENKINS, 1989. An endemic radiation of Hydrobiidae from artesian springs in northern South Australia - their taxonomy, physiology, distribution and anatomy. *Malacologia* **31**, 1-140.

ZEIDLER, W. & W.F. PONDER (Eds), 1989. *The Natural History of Dalhousie Springs.* South Australian Museum, Adelaide. 138 pp.

1990

BOWLING, L.C. & P.A. TYLER, 1990. Chemical stratification and partial meromixis in reservoirs in Tasmania. *Hydrobiologia* **194**, 67-83.

GEHRKE, P.C. 1990. Clinotactic responses of larval Silver Perch (*Bidyanus bidyanus*) and Golden Perch (*Macquaria ambigua*) to simulated environmental gradients. *Aust. J. Mar. Freshwat. Res.* **41**, 523-528.



"Good heavens, Bernie! We've got company!... And you're never going to catch that stupid squirrel anyway!"

Inundated floodplain as fish nursery habitats: a status report.

by Peter Gehrke

Inland Fisheries Research Station, Narrandera

For the past couple years I've been looking at the behaviour of larval and juvenile native Fish in floodplain habitats. It's worth spreading a few ideas around to give an overview and find out how lower levels of trophic organisation can contribute to fish recruitment.

I started working on fish larvae at the time when ideas of experimental manipulation of water levels in floodplain habitats were flavour of the month. From a fisheries perspective, the (very) general model of reproduction and recruitment follows the lines of:

1. Fish spawn just before or during a flood.
2. Inundated floodplain releases nutrients.
3. Nutrients support plankton bloom.
4. Fish larvae prey and thrive on plankton.
5. Flood recedes and recruitment of juveniles to population is successful.

The model subsequently spawned ideas that ailing populations of native fish can be rejuvenated by creating artificial floods to enhance reproduction and recruitment.

Experimental attempts to validate the model using golden perch larvae provided negative results. Fish numbers in the inundated floodplain were much lower than in nearby deep water, and larvae actively avoided the floodplain, contrary to predictions from the model. Plankton densities on the floodplain were higher than in the preferred pond habitat, but abundance of prey did not entice larvae back onto the floodplain.

Dissolved oxygen levels were critically low in floodplain waters, but the pond surface waters were well oxygenated. Also, floodplain waters were darkly coloured.

At very low concentrations (not measured), golden perch larvae are attracted to leachates from red gum timber, but no amino acids were found in the leachate. However, increasing nominal concentrations of red gum extract from 0.001 g/l to 0.1 g/1 caused a decrease in spontaneous activity of the larvae, with death occurring in 2 to 24 h. Using three month old juvenile golden perch, the situation changes with increasing concentrations of red gum extract causing an increase in spontaneous activity, and death within 6 h. Analysis of the extract showed 0.028 g of tannin or tannin-like compounds was obtained from each gram of red gum timber. Oligomeric, or un- oxidised tannins, react strongly with proteins, and are highly toxic to fish and other organisms right down to methanogenic bacteria.

Oxidation polymerises the tannin molecules with a resultant loss of toxic effects, and creates a darker coloured solution. The bark of some native trees is very rich in tannins, up to 57%, and un-oxidised tannins have a very high chemical oxygen demand.

This is where observations end and the hypotheses begins. The floodplain which I was studying has many *Acacia* trees on its perimeter, and these were partially inundated during the experiments. *Acacia* bark tends to be high in tannins, and it is possible that tannins leached into the water on the floodplain. Floodplain water, already low in dissolved oxygen due to plankton and microbial respiration, received the added chemical oxygen demand of the tannins which, in the relative absence of oxygen, remained in their toxic oligomeric state. Fish larvae are therefore faced with two adverse challenges: low dissolved oxygen levels and tannin toxicity. Those which are able avoid the affected areas, resulting in mass movement of larvae away from the floodplain. The remaining larvae die.

If proven, these hypotheses have serious implications for attempts to create nursery habitats for fish by artificially inundating areas of natural floodplain. Tannin content of local vegetation and floodplain litter may produce totally unsuitable habitats for developing fish larvae. Dilution flows may solve the problem during a natural flood, but large-scale flows during artificial floods may provide downstream transport of nutrients, plankton and fish, and generally defeat the purpose of the exercise. The key appears to lie in the type of floodplain selected and the vegetation supported. To say the least, red gum forests should perhaps be ruled out as likely contenders.

EXECUTIVE MEMBERS

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Dr Richard Norris, Applied Science, University of Canberra, PO Box 1, Belconnen ACT 2616 Ph: (062) 522543 [FAX: (062 522999]

Mr John Hawking, MDFRC, PO Box 921, Albury NSW 2640 Ph: (060) 431002 [FAX: (060) 431626]

Ms Fran Sheldon, Dept. Zoology, University of Adelaide, Box 498 GPO, Adelaide SA 5001 Ph: (08) 2285333 [FAX: (08) 2235817]

Dr Stuart Halse, CALM, PO Box 51, Wanneroo WA 6065 Ph: (09) 4055100 [FAX: (09) 3061649]

Dr Pierre Horwitz, Dept. Geograph & Environ Studies, University of Tasmania, GPO Box 252C, Hobart TAS 7001 Ph: (002) 202840 [FAX: (002) 202186]

Dr Rob Congdon, Botany Dept., James Cook University, Townsville QLD 4811 Ph: (077) 814731 [FAX: (077) 251570]

Dr Bob Pidgeon, Office of the Supervising Scientist, PMB Jabiru NT 0886 Ph: (089) 799711 [FAX: (089) 792076]